

Listing of Claims

1. (original) A liquid jet head comprising:
a nozzle element having nozzles from which a recording liquid is ejected to a recording medium,
wherein the recording liquid contains fine particles of a pigment,
wherein the fine particles of the pigment contained in the recording liquid are no less than 1% by weight,
wherein each of the nozzles has an area that is less than $500\mu\text{m}^2$,
wherein each of the fine particles of the pigment has a diameter satisfying a relation of $0.0005 \leq D_p/D_o \leq 0.02$,
wherein “ D_p ” represents the diameter of each of the fine particles of the pigment and “ D_o ” represents a size of each of the nozzles,
wherein when the nozzle element ejects the recording liquid onto the recording medium, a contact angle of the recording liquid stops changing when 100 ms or less elapses after the recording liquid contacts the recording medium,
wherein the fine particles of the pigment are smaller than fibers of the recording medium,
wherein the fine particles of the pigment are smaller than spaces between the fibers of the recording medium.
2. (original) The liquid jet head as claimed in claim 1, wherein the fine particles of the pigment are dispersed in the recording liquid by including a dispersant in the recording liquid.

3. (original) The liquid jet head as claimed in claim 1, wherein the fine particles of the pigment are dispersed in the recording liquid by surface processing the fine particles of the pigment.

4. (original) The liquid jet head as claimed in claim 1, wherein the fine particles of the pigment contained in the recording liquid range from 2% to 10% by weight,
wherein a solid content of the recording liquid including the fine particles of the pigment contained in the recording liquid is no more than 15% by weight.

5. (original) The liquid jet head as claimed in claim 1, further comprising one or more other nozzle elements respectively having nozzles from which one or more other recording liquids are ejected to the recording medium.

6. (original) The liquid jet head as claimed in claim 5, wherein the one or more other nozzle elements are integrally formed to thereby form a head unit.

7. (original) The liquid jet head as claimed in claim 6, wherein the head unit has a recording head portion and a recording liquid container portion,
wherein the recording head portion and the recording liquid container portion are integrally formed.

8. (original) The liquid jet head as claimed in claim 6, wherein the head unit has a recording head portion and a recording liquid container portion,

wherein the recording liquid container portion is detachably attached to the recording head portion.

9. (original) The liquid jet head as claimed in claim 8, wherein the recording liquid container portion is detachable according to type of the one or more other recording liquids.

10. (original) The liquid jet head as claimed in claim 1, wherein the liquid jet head employs a thermal liquid jet method which uses heat for ejecting recording liquid therefrom.

11. (withdrawn) A liquid jet head comprising:
a nozzle element having nozzles from which a recording liquid is ejected to a recording medium,
wherein the recording liquid contains fine particles of a pigment,
wherein the fine particles of the pigment contained in the recording liquid are no less than 1% by weight,
wherein each of the nozzles has an area that is less than $500\mu\text{m}^2$,
wherein each of the fine particles of the pigment has a diameter satisfying a relation of $0.0005 \leq D_p/D_o \leq 0.02$,
wherein “ D_p ” represents the diameter of each of the fine particles of the pigment and “ D_o ” represents a size of each of the nozzles,
wherein when the nozzle element ejects the recording liquid onto the recording

medium, a contact angle of the recording liquid stops changing when 100 ms or less elapses after the recording liquid contacts the recording medium,

wherein the recording medium has a surface coated with a coating material,

wherein the fine particles of the pigment have an average diameter that is equal to or less than an average diameter of particles forming the coating material,

wherein the average diameter of the fine particles of the pigment is smaller than smoothness of the coated surface of the recording medium.

12. (withdrawn) The liquid jet head as claimed in claim 11, wherein the fine particles of the pigment are dispersed in the recording liquid by including a dispersant in the recording liquid.

13. (withdrawn) The liquid jet head as claimed in claim 11, wherein the fine particles of the pigment are dispersed in the recording liquid by surface processing the fine particles of the pigment.

14. (withdrawn) The liquid jet head as claimed in claim 11, wherein the fine particles of the pigment contained in the recording liquid range from 2% to 10% by weight,

wherein a solid content of the recording liquid including the fine particles of the pigment contained in the recording liquid is no more than 15% by weight.

15. (withdrawn) The liquid jet head as claimed in claim 11, further comprising one or more other nozzle elements respectively having nozzles from which one or more other

recording liquids are ejected to the recording medium.

16. (withdrawn) The liquid jet head as claimed in claim 15, wherein the one or more other nozzle elements are integrally formed to thereby form a head unit.

17. (withdrawn) The liquid jet head as claimed in claim 16, wherein the head unit has a recording head portion and a recording liquid container portion,

wherein the recording head portion and the recording liquid container portion are integrally formed.

18. (withdrawn) The liquid jet head as claimed in claim 16, wherein the head unit has a recording head portion and a recording liquid container portion,

wherein the recording liquid container portion is detachably attached to the recording head portion.

19. (withdrawn) The liquid jet head as claimed in claim 18, wherein the recording liquid container portion is detachable according to type of the one or more other recording liquids.

20. (withdrawn) The liquid jet head as claimed in claim 11, wherein the liquid jet head employs a thermal liquid jet method which uses heat for ejecting recording liquid therefrom.

21. (withdrawn) A liquid jet head comprising:

a nozzle element having nozzles from which a recording liquid is ejected to a recording medium,

wherein the recording liquid contains fine particles of a pigment,

wherein the fine particles of the pigment contained in the recording liquid are no less than 1% by weight,

wherein each of the nozzles has an area that is less than $500\mu\text{m}^2$,

wherein each of the fine particles of the pigment has a diameter satisfying a relation of $0.0005 \leq D_p/D_o \leq 0.02$,

wherein “Dp” represents the diameter of each of the fine particles of the pigment and “Do” represents a size of each of the nozzles,

wherein when the nozzle element ejects the recording liquid onto the recording medium, a contact angle of the recording liquid stops changing when 100 ms or less elapses after the recording liquid contacts the recording medium,

wherein the recording medium is a resin material having a surface coated with a coating material,

wherein the fine particles of the pigment have an average diameter that is equal to or less than an average diameter of particles forming the coating material,

wherein the average diameter of the fine particles of the pigment is smaller than smoothness of the coated surface of the recording medium.

22. (withdrawn) The liquid jet head as claimed in claim 21, wherein the fine particles of the pigment are dispersed in the recording liquid by including a dispersant in the recording

liquid.

23. (withdrawn) The liquid jet head as claimed in claim 21, wherein the fine particles of the pigment are dispersed in the recording liquid by surface processing the fine particles of the pigment.

24. (withdrawn) The liquid jet head as claimed in claim 21, wherein the fine particles of the pigment contained in the recording liquid range from 2% to 10% by weight,
wherein a solid content of the recording liquid including the fine particles of the pigment contained in the recording liquid is no more than 15% by weight.

25. (withdrawn) The liquid jet head as claimed in claim 21, further comprising one or more other nozzle elements respectively having nozzles from which one or more other recording liquids are ejected to the recording medium.

26. (withdrawn) The liquid jet head as claimed in claim 25, wherein the one or more other nozzle elements are integrally formed to thereby form a head unit.

27. (withdrawn) The liquid jet head as claimed in claim 26, wherein the head unit has a recording head portion and a recording liquid container portion,
wherein the recording head portion and the recording liquid container portion are integrally formed.

28. (withdrawn) The liquid jet head as claimed in claim 26, wherein the head unit has a recording head portion and a recording liquid container portion,

wherein the recording liquid container portion is detachably attached to the recording head portion.

29. (withdrawn) The liquid jet head as claimed in claim 28, wherein the recording liquid container portion is detachable according to type of the one or more other recording liquids.

30. (withdrawn) The liquid jet head as claimed in claim 21, wherein the liquid jet head employs a thermal liquid jet method which uses heat for ejecting recording liquid therefrom.

31. (original) A liquid jet recording apparatus comprising:
a liquid jet head including a nozzle element having nozzles from which a recording liquid is ejected to a recording medium;

a carriage mounting the liquid jet head;

a guiding rod guiding the carriage;

a conveying roller conveying the recording medium;

a holding roller holding the recording medium,

wherein the recording liquid contains fine particles of a pigment,

wherein the fine particles of the pigment contained in the recording liquid are no less than 1% by weight,

wherein each of the nozzles has an area that is less than $500\mu\text{m}^2$,

wherein each of the fine particles of the pigment has a diameter satisfying a relation of $0.0005 \leq D_p/D_o \leq 0.02$,

wherein “ D_p ” represents the diameter of each of the fine particles of the pigment and “ D_o ” represents a size of each of the nozzles,

wherein when the nozzle element ejects the recording liquid onto the recording medium, a contact angle of the recording liquid stops changing when 100 ms or less elapses after the recording liquid contacts the recording medium,

wherein the fine particles of the pigment are smaller than fibers of the recording medium,

wherein the fine particles of the pigment are smaller than spaces between the fibers of the recording medium.

32. (original) The liquid jet recording apparatus as claimed in claim 31, wherein the fine particles of the pigment are dispersed in the recording liquid by including a dispersant in the recording liquid.

33. (original) The liquid jet recording apparatus as claimed in claim 31, wherein the fine particles of the pigment are dispersed in the recording liquid by surface processing the fine particles of the pigment.

34. (original) The liquid jet recording apparatus as claimed in claim 31, wherein the fine particles of the pigment contained in the recording liquid range from 2% to 10% by

weight,

wherein a solid content of the recording liquid including the fine particles of the pigment contained in the recording liquid is no more than 15% by weight.

35. (withdrawn) A liquid jet recording apparatus comprising:

a liquid jet head including a nozzle element having nozzles from which a recording liquid is ejected to a recording medium,

a carriage mounting the liquid jet head;

a guiding rod guiding the carriage;

a conveying roller conveying the recording medium;

a holding roller holding the recording medium,

wherein the recording liquid contains fine particles of a pigment,

wherein the fine particles of the pigment contained in the recording liquid are no less than 1% by weight,

wherein each of the nozzles has an area that is less than $500\mu\text{m}^2$,

wherein each of the fine particles of the pigment has a diameter satisfying a relation of $0.0005 \leq D_p/D_o \leq 0.02$,

wherein “ D_p ” represents the diameter of each of the fine particles of the pigment and “ D_o ” represents a size of each of the nozzles,

wherein when the nozzle element ejects the recording liquid onto the recording medium, a contact angle of the recording liquid stops changing when 100 ms or less elapses after the recording liquid contacts the recording medium,

wherein the recording medium has a surface coated with a coating material,

wherein the fine particles of the pigment have an average diameter that is equal to or less than an average diameter of particles forming the coating material,

wherein the average diameter of the fine particles of the pigment is smaller than smoothness of the coated surface of the recording medium.

36. (withdrawn) The liquid jet recording apparatus as claimed in claim 35, wherein the fine particles of the pigment are dispersed in the recording liquid by including a dispersant in the recording liquid.

37. (withdrawn) The liquid jet recording apparatus as claimed in claim 35, wherein the fine particles of the pigment are dispersed in the recording liquid by surface processing the fine particles of the pigment.

38. (withdrawn) The liquid jet recording apparatus as claimed in claim 35, wherein the fine particles of the pigment contained in the recording liquid range from 2% to 10% by weight,

wherein a solid content of the recording liquid including the fine particles of the pigment contained in the recording liquid is no more than 15% by weight.

39. (withdrawn) A liquid jet recording apparatus comprising:
a liquid jet head including a nozzle element having nozzles from which a recording liquid is ejected to a recording medium,
a carriage mounting the liquid jet head;

a guiding rod guiding the carriage;
a conveying roller conveying the recording medium;
a holding roller holding the recording medium,
wherein the recording liquid contains fine particles of a pigment,
wherein the fine particles of the pigment contained in the recording liquid are no less than 1% by weight,
wherein each of the nozzles has an area that is less than $500\mu\text{m}^2$,
wherein each of the fine particles of the pigment has a diameter satisfying a relation of $0.0005 \leq D_p/D_o \leq 0.02$,
wherein “ D_p ” represents the diameter of each of the fine particles of the pigment and “ D_o ” represents a size of each of the nozzles,
wherein when the nozzle element ejects the recording liquid onto the recording medium, a contact angle of the recording liquid stops changing when 100 ms or less elapses after the recording liquid contacts the recording medium,
wherein the recording medium is a resin material having a surface coated with a coating material,
wherein the fine particles of the pigment have an average diameter that is equal to or less than an average diameter of particles forming the coating material,
wherein the average diameter of the fine particles of the pigment is smaller than smoothness of the coated surface of the recording medium.

40. (withdrawn) The liquid jet recording apparatus as claimed in claim 39, wherein the fine particles of the pigment are dispersed in the recording liquid by including a dispersant

in the recording liquid.

41. (withdrawn) The liquid jet recording apparatus as claimed in claim 39, wherein the fine particles of the pigment are dispersed in the recording liquid by surface processing the fine particles of the pigment.

42. (withdrawn) The liquid jet recording apparatus as claimed in claim 39, wherein the fine particles of the pigment contained in the recording liquid range from 2% to 10% by weight,

wherein a solid content of the recording liquid including the fine particles of the pigment contained in the recording liquid is no more than 15% by weight.

43. (original) A recording liquid used in a liquid jet head including a nozzle element having nozzles from which the recording liquid is ejected to a recording medium, the recording liquid comprising:

fine particles of a pigment,

wherein the fine particles of the pigment contained in the recording liquid are no less than 1% by weight,

wherein each of the nozzles has an area that is less than $500\mu\text{m}^2$,

wherein each of the fine particles of the pigment has a diameter satisfying a relation of $0.0005 \leq D_p/D_o \leq 0.02$,

wherein “ D_p ” represents the diameter of each of the fine particles of the pigment and “ D_o ” represents a size of each of the nozzles,

wherein when the nozzle element ejects the recording liquid onto the recording medium, a contact angle of the recording liquid stops changing when 100 ms or less elapses after the recording liquid contacts the recording medium,

wherein the fine particles of the pigment are smaller than fibers of the recording medium,

wherein the fine particles of the pigment are smaller than spaces between the fibers of the recording medium.

44. (original) The recording liquid as claimed in claim 43, wherein the fine particles of the pigment are dispersed in the recording liquid by including a dispersant in the recording liquid.

45. (original) The recording liquid as claimed in claim 44, wherein the fine particles of the pigment are dispersed in the recording liquid by surface processing the fine particles of the pigment.

46. (original) The recording liquid as claimed in claim 43, wherein the fine particles of the pigment contained in the recording liquid range from 2% to 10% by weight,
wherein a solid content of the recording liquid including the fine particles of the pigment contained in the recording liquid is no more than 15% by weight.

47. (withdrawn) A recording liquid used in a liquid jet head including a nozzle element having nozzles from which the recording liquid is ejected to a recording medium, the

recording liquid comprising:

fine particles of a pigment,

wherein the fine particles of the pigment contained in the recording liquid are no less than 1% by weight,

wherein each of the nozzles has an area less than $500\mu\text{m}^2$,

wherein each of the fine particles of the pigment has a diameter satisfying a relation of $0.0005 \leq D_p/D_o \leq 0.02$,

wherein “ D_p ” represents the diameter of each of the fine particles of the pigment and “ D_o ” represents a size of each of the nozzles,

wherein when the nozzle element ejects the recording liquid onto the recording medium, a contact angle of the recording liquid stops changing when 100 ms or less elapses after the recording liquid contacts the recording medium,

wherein the recording medium has a surface coated with a coating material,

wherein the fine particles of the pigment have an average diameter that is equal to or less than an average diameter of particles forming the coating material,

wherein the average diameter of the fine particles of the pigment is smaller than smoothness of the coated surface of the recording medium.

48. (withdrawn) The recording liquid as claimed in claim 47, wherein the fine particles of the pigment are dispersed in the recording liquid by including a dispersant in the recording liquid.

49. (withdrawn) The recording liquid as claimed in claim 47, wherein the fine

particles of the pigment are dispersed in the recording liquid by surface processing the fine particles of the pigment.

50. (withdrawn) The recording liquid as claimed in claim 47, wherein the fine particles of the pigment contained in the recording liquid range from 2% to 10% by weight, wherein a solid content of the recording liquid including the fine particles of the pigment contained in the recording liquid is no more than 15% by weight.

51. (withdrawn) A recording liquid used in a liquid jet head including a nozzle element having nozzles from which the recording liquid is ejected to a recording medium, the recording liquid comprising:

fine particles of a pigment,

wherein the fine particles of the pigment contained in the recording liquid are no less than 1% by weight,

wherein each of the nozzles has an area that is less than $500\mu\text{m}^2$,

wherein each of the fine particles of the pigment has a diameter satisfying a relation of $0.0005 \leq D_p/D_o \leq 0.02$,

wherein "Dp" represents the diameter of each of the fine particles of the pigment and "Do" represents a size of each of the nozzles,

wherein when the nozzle element ejects the recording liquid onto the recording medium, a contact angle of the recording liquid stops changing when 100 ms or less elapses after the recording liquid contacts the recording medium,

wherein the recording medium is a resin material having a surface coated with a

coating material,

wherein the fine particles of the pigment have an average diameter that is equal to or less than an average diameter of particles forming the coating material,

wherein the average diameter of the fine particles of the pigment is smaller than smoothness of the coated surface of the recording medium.

52. (withdrawn) The recording liquid as claimed in claim 51, wherein the fine particles of the pigment are dispersed in the recording liquid by including a dispersant in the recording liquid.

53. (withdrawn) The recording liquid as claimed in claim 51, wherein the fine particles of the pigment are dispersed in the recording liquid by surface processing the fine particles of the pigment.

54. (withdrawn) The recording liquid as claimed in claim 51, wherein the fine particles of the pigment contained in the recording liquid range from 2% to 10% by weight,

wherein a solid content of the recording liquid including the fine particles of the pigment contained in the recording liquid is no more than 15% by weight.